UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/539,131	06/16/2005	Andreas Wolfert	272982US0PCT	2737

22850 7590 07/18/2007

OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER	
PUTTLITZ, KARL J	

ART UNIT	PAPER NUMBER
1621	

NOTIFICATION DATE	DELIVERY MODE
07/18/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com
oblonpat@oblon.com
jgardner@oblon.com

Office Action Summary	Application No.	Applicant(s)	
	10/539,131	WOLFERT ET AL.	
	Examiner	Art Unit	
	Karl J. Puttlitz	1621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 June 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 June 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

KARL PUTTLITZ
PATENT EXAMINER

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10/17/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

A brief description of the drawing is required to be present in the specification.

Claim Objections

Claim 1 is objected to because of the following informalities: "in a distillation" Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is unclear how in sterp d of claim 1 how streams 4 and 3 arer separated into three individual streams. In this regard, are the streams merged and then separated, or are streams 4 and 3 divided separately from one another.

It is unclear how stream 4 originates, i.e., from the distillation column that separated streams 2 and 3?

Claims 8-11 contain numerical designations. It is unclear if these designations refer to a figure. If so, then it is unclear if Applicant intends the claim to be limited to any particular embodiment in the figure.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,803,483 to Lokum et al. (Lokum).

Lokum teaches a process for the purification of toluenediisocyanate by fractionating a crude distillation feed comprising toluenediisocyanate, an organic solvent and less than 2% by weight of phosgene in a heat integrated system comprising an upstream distillation column, an interchanger and a downstream distillation column which are connected in series, whereby the vapor which is recovered from the upstream distillation column is used to reboil the bottoms product of the downstream distillation column or the feed to the downstream distillation column in the interchanger, and whereby the crude distillation feed comprising less than 2% by weight of phosgene is fractionated into three product fractions P1-P3 and optionally a fourth product fraction P4, whereby

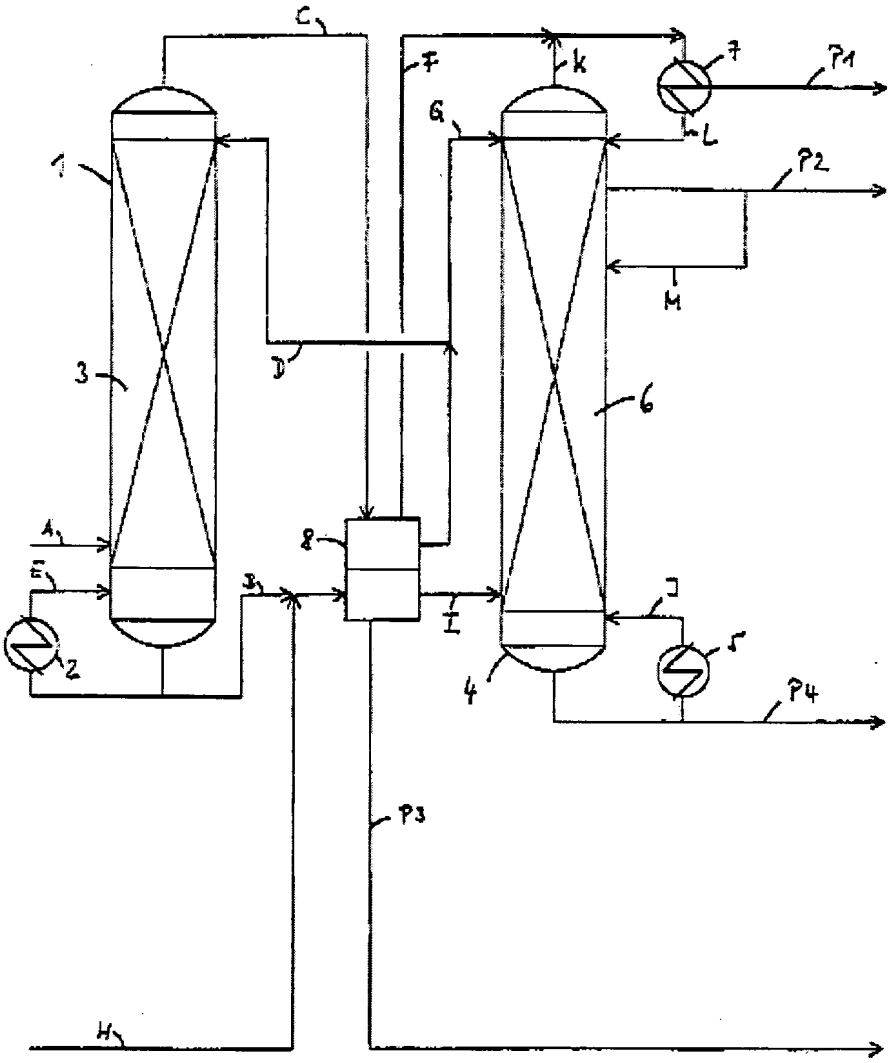
P1 is a noncondensible gas stream enriched with phosgene and/or low-boilers,

P2 is a solvent-enriched product,

P3 is a high boiler enriched bottoms product comprising toluenediisocyanat and

P4 is a toluenediisocyanate enriched stream lean in high-boilers and reaction residues. See description bridging columns 4 and 5.

Lokum teaches the instant invention at Example 1, withy reference to the following figure:



wherein a crude reaction mixture, containing 1000 kg/h toluenediisocyanate is completely dephosgenated and the dephosgenated reaction product is mixed with solvent from process sources (i.e. washers, vacuum systems, etc.), and the volatiles recovered from the residue removal to yield a crude distillation feed A with a mass flowrate of 10534 kg/h at a temperature of 149 C., which is in the liquid phase at atmospheric pressure. The crude distillation feed A has the following composition by weight: 10.5% toluenediisocyanate (TDI), 0.2% TDI-residue, 0.006% hydrolyzable chloride compounds (HCC), and a trace amount of low-boilers and noncondensables, with the rest being o-dichlorobenzene. The bottoms products of the upstream distillation column 1 is partially vaporized to generate the vapor stream E and the liquid product B. Stream B has a flowrate of 6298 kg/h which is at a saturation point of 180 C. at 878 mbar. Stream B has a composition by weight of 17.5% TDI, 0.3% residue, 0.01% hydrolyzable chlorides, and the rest being ODB. Stream B is mixed with the bottoms product H from the TDI purification column (not shown) and fed to the vaporizing zone of the interchanger 8. Vapor stream E is fed to the upstream distillation column 1 which has 13 theoretical stages of structured packing 3 in the rectification zone. The upstream distillation column 1 operates at a top pressure of 864 mbar with a pressure drop of 14 mbar. Stream E as well as the reflux stream D effect the necessary fractionation in the upstream distillation column 1. The vapor product C from the upstream distillation column 1 is fed to the condensing zone of the interchanger 8.

In the interchanger 8, the vapor stream C from the upstream distillation column 1 is almost completely condensed and the energy is used to partially vaporize the mixture

of streams B and H. All noncondensibles and uncondensed vapors (stream F) are fed to the condenser 7 of the downstream distillation column 4. Stream F is at 165 C and 864 mbar and has a flowrate of 50 kg/h and a weight composition of 5% inert gases and 95% o-dichlorobenzene. A portion of the condensate is fed as reflux D to the upstream distillation column 1. The remainder of the condensate, stream G is fed to the top stage of the downstream distillation column 4 to effect the removal of phosgene and other low-boilers from the solvent product. G is a saturated liquid at 165.degree. C. and 864 mbar. It has a flowrate of 4233 kg/h and a composition of 10 ppm by weight TDI with between 300 and 400 ppm lowboilers and the rest being o-dichlorobenzene. In this case a reflux ratio of 0.334 is maintained for the upstream distillation column 1 to achieve a TDI concentration in stream G of 10 ppm by weight TDI. The resulting vapor product I from the vaporizing zone of the interchanger 8 is fed to the downstream distillation column 4, the remaining product P3 is fed to the residue removal system (not shown). The product P3 is a saturated liquid at 157 C and 224 mbar. It has a flowrate of 178 kg/h and a weight composition 30.6% o-dichlorobenzene, 10% residue, 0.13% hydrolyzable chlorides, and the rest TDI.

The downstream distillation column 4 is designed with 19 theoretical stages of structured packing. The column operates at a top pressure drop of 205 mbar and a pressure drop over the column of 20 mbar. The vapor stream I from the interchanger, 8 is fed to the downstream distillation column 4 below the packing. In this column, fractionation is performed to achieve a bottoms product P4 that is enriched in TDI, a vapor product P1 enriched in non-condensibles and low-boilers and a solvent product

P2, lean in TDI and low-boiler species. This fractionation is effected by the condenser 7 and the reboiler 5. In the condenser 7, the vapor product K from the downstream distillation column 4 as well as the uncondensed vapor from the condensing zone of the interchanger (stream F) are almost completely condensed, resulting in the vapor stream P1, and the condensate stream L. Stream P1 has a flowrate of 50 kg/h and a composition by weight 20% non-condensibles and 80% o-dichlorobenzene at a temperature of 102 C and a pressure at 205 mbar. Stream L as well as stream G are fed to the top of the downstream distillation column 4. In this example, the downstream distillation column 4 is designed to provide 1 theoretical stripping stage for the separation of low-boilers from the o-dichlorobenzene product P2. The o-dichlorobenzene product, P2 is removed as a sidedraw product. P2 is a saturated liquid at 125 C and 207 mbar, and has a flowrate of 8811 kg/h. It has a composition by weight of 10 ppm TDI with the rest being o-dichlorobenzene. A reflux ratio of 0.266 is required for the downstream distillation column 4 to reach this product purity. The product P4 is taken from the sump of the downstream distillation column 4 and is fed to an additional distillation column (not shown) for the removal of the remaining solvent and the subsequent purification of the TDI product. Product P4 is a saturated liquid at 155 C and 224 mbar. It has a flowrate of 1676 kg/h and a composition by weight of 32.4% o-dichlorobenzene, 0.09% hydrolyzable chlorine, and the rest being TDI.

The difference between the process set forth in Lokum and the process covered in the rejected claims is that Lokum fails to teach the particular evaporators, interchangersn columns and dryers required by the claims. However, Lokum suggests

that these devices are within the disclosed process and thus within the purview of those of ordinary skill, see column 6, lines 44+.

Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

Claims 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 7,108,770 to Grun et al. (Grun).

Grun teaches a process wherein toluene diamine is reacted with phosgene in the presence of a solvent in the liquid phase or to a process in which toluene diamine is reacted with phosgene directly in the gas phase with a solvent used in the quench cooling of said reaction. Excess phosgene is then partially or completely removed from the resulting reaction mixture and the de-phosgenated crude distillation feed is fed to a fractionation process in which the solvent and, optionally, the residue is (are) removed. The subsequent crude TDI feed is fed to a divided-wall distillation column in which four fractions are recovered:

1) a vapor phase low-boiler and solvent enriched product from which the condensable species are preferably recovered and returned to the de-phosgenation, residue removal, or solvent removal process;

2) a low-boiler enriched product which is then preferably returned to the de-phosgenation, residue removal, or solvent removal process or recovered as a separate product stream;

3) a high-boiler enriched bottoms product which is preferably sent to a residue removal system for the further recovery of volatiles; and

4) an isocyanate product stream.

Grun teaches that a preferred embodiment of the invention is directed to a process for the purification of toluene diisocyanate from a crude distillation feed comprising less than 2% by weight of phosgene by a) fractionating the crude distillation feed comprising less than 2% by weight of phosgene to remove the solvent and, optionally, the reaction residues to produce a crude toluene diisocyanate feed comprising less than 20% by weight of solvent and b) separating the crude toluene diisocyanate feed comprising less than 20% by weight of solvent in a dividing-wall distillation column into four product fractions P1 P4, whereby P1 is a vapor phase low-boiler and solvent-enriched gas stream, P2 is a low-boiler and solvent-enriched product, P3 is a high boiler-enriched bottoms product comprising toluene diisocyanate and P4 is a toluene diisocyanate product stream which is lean in low-boilers, high-boilers and reaction residues.

The difference between the process set forth in the rejected claims and the process disclosed by Grun is that Grun fails to explicitly teach a vapor stream 3 and 4. However, The TDI stream of Grun can also be a vapor stream which h can correspond to the claimed vapor streams. Therefore, the claimed vapor streams 3 and 4 are well

within the purview of those of ordinary skill, based on Grun, and thus, prima faice obvious.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karl J. Puttlitz whose telephone number is (571) 272-0645. The examiner can normally be reached on Monday to Friday from 9 a.m. to 5 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yvonne Eyler, can be reached at telephone number (571) 272-0871. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KARL PUTTLITZ
PATENT EXAMINER

7/9/2007